

Application No.: 10/673,764

Attorney Docket No.: SHA-129

Amendment Dated: April 6, 2005

Reply for Office Action Dated: October 6, 2005

AMENDMENTS TO THE CLAIMS

1. (Currently Amend) A cartridge seal assembly, comprising:

a housing having a channel space formed therein to define an inner surface;

a bearing device joined bonded to said housing at the inner surface thereof and having at least one bearing surface; and

at least one seal removably joined to said housing, at least one of said at least one seal being disposed generally axially of at least part of said bearing device.

2. (Original) The cartridge seal assembly as recited in Claim 1, wherein said bearing device and/or at least one of said at least one seal being bonded to said housing.

3. (Cancelled) The cartridge seal assembly as recited in Claim 1, wherein said bearing device being fixedly mounted to said housing.

4. (Original) The cartridge seal assembly as recited in Claim 1, wherein the joining relationship between said bearing device and said housing being defined by a substantially gap-free interface.

5. (Original) The cartridge seal assembly as recited in Claim 1, wherein the joining interface between said housing and said bearing device being substantially free of extrusion gaps.

6. (Original) The cartridge seal assembly as recited in Claim 1, wherein said at least one seal further includes:

Application No.: 10/673,764

Attorney Docket No.: SHA-129

Amendment Dated: April 6, 2005

Reply for Office Action Dated: October 6, 2005

a first generally annular seal disposed at one axial side of said bearing device, said first seal including at least one static sealing area and/or at least one dynamic sealing area.

7. (Original) The cartridge seal assembly as recited in Claim 6, wherein said at least one seal further includes:

a second generally annular seal disposed at another axial side of said bearing device, said second seal including a wiper element.

8. (Original) The cartridge seal assembly as recited in Claim 7, wherein one end of said housing proximal said first seal defining a high pressure end, and another end of said housing proximal said second seal defining a comparatively low pressure end.

9. (Original) The cartridge seal assembly as recited in Claim 6, wherein said first seal further includes:

a body portion;

a first leg portion extending generally radially inward from said body portion;

a second leg portion extending generally radially outward from said body portion; and

a finger portion having a proximal end and a distal end, the finger portion extending generally radially outward at the proximal end thereof from said second leg portion along an end surface of said housing, the distal end defining a terminal lip having a surface extending at least in part radially outward past an axial plane of the radially outermost surface of said housing.

Application No.: 10/673,764

Attorney Docket No.: SHA-129

Amendment Dated: April 6, 2005

Reply for Office Action Dated: October 6, 2005

10. (Original) The cartridge seal assembly as recited in Claim 6, wherein the at least one static sealing area of said first seal being disposed at least in part beyond a generally axially-facing surface of said housing and/or a radially outer surface of said housing.

11. (Original) The cartridge seal assembly as recited in Claim 6, wherein the at least one static sealing area of said first seal further includes:

a first static sealing portion extending generally radially along a generally axially-facing end surface of said housing; and

a second static sealing portion engaging the first static sealing portion and extending at least in part immediately past the axial plane of an outer radial surface of said housing.

12. (Original) The cartridge seal assembly as recited in Claim 11, wherein the second static sealing portion of said first seal being made of a compressible material and being sufficiently formed such that during operative field installation as the second static sealing portion engages an opposing surface of a field device and thereby experiences compression, the compressed second static sealing portion forms a substantially fluid-tight seal circumferentially about said housing between the outer radial surface of said housing and said field device.

13. (Original) The cartridge seal assembly as recited in Claim 6, wherein the at least one dynamic sealing area of said first seal further includes:

a contoured surface extending at least in part radially inward at least to the plane of the bearing surface of said bearing device to define at least one sealing line.

Application No.: 10/673,764

Attorney Docket No.: SHA-129

Amendment Dated: April 6, 2005

Reply for Office Action Dated: October 6, 2005

14. (Original) The cartridge seal assembly as recited in Claim 1, wherein said at least one seal further includes:

a first seal substantially covering a first end face of said housing and having a terminal lip portion;

said terminal lip portion extending at least immediately past an axial plane of a radially outer surface of said housing to an extent sufficient to at least touch an opposing surface of a field device during installation of said cartridge seal assembly therein.

15. (Original) The cartridge seal assembly as recited in Claim 1, wherein said at least one seal further includes:

a generally annular seal portion circumferentially disposed at least in part about said housing.

16. (Original) The cartridge seal assembly as recited in Claim 1, wherein said at least one seal further includes:

a first generally annular seal disposed at least in part within a first groove defined in said housing at one axial side of said bearing device; and

a second generally annular seal disposed at least in part within a second groove defined in said housing at another axial side of said bearing device.

17. (Original) The cartridge seal assembly as recited in Claim 16, wherein:

said first seal includes a static sealing area and/or a dynamic sealing area; and

said second seal defining a wiper configuration.

Application No.: 10/673,764

Attorney Docket No.: SHA-129

Amendment Dated: April 6, 2005

Reply for Office Action Dated: October 6, 2005

18. (Cancel) The cartridge seal assembly as recited in Claim 16, wherein said first groove and said second groove defining a first portion of said housing therebetween that joiningly receives said bearing device, each of said first seal and said second seal being bonded to the first housing portion.

19. (Withdrawn) The cartridge seal assembly as recited in Claim 1, wherein said bearing device and/or at least one seal being removably joined to said housing.

20. (Currently Amended) A cartridge seal assembly, comprising:

a housing having a channel space formed therein to define an inner surface;  
a bearing device joined to said housing at the inner surface thereof by bonding and having at least one bearing surface; and  
a first generally annular seal disposed generally axially of said bearing device and removably joined to said housing, said first seal having a static sealing area and/or a dynamic sealing area.

21. (Cancelled) The cartridge seal assembly as recited in Claim 20, wherein at least one of said bearing device and said first seal being bonded to said housing.

22. (Cancelled) The cartridge seal assembly as recited in Claim 20, wherein said bearing device being fixedly mounted to said housing.

23. (Original) The cartridge seal assembly as recited in Claim 20, wherein the joining relationship between said bearing device and said housing being defined by a substantially gap-free interface.

Application No.: 10/673,764

Attorney Docket No.: SHA-129

Amendment Dated: April 6, 2005

Reply for Office Action Dated: October 6, 2005

24. (Original) The cartridge seal assembly as recited in Claim 20, wherein the joining interface between said housing and said bearing device being substantially free of extrusion gaps.

25. (Original) The cartridge seal assembly as recited in Claim 20, further includes:

a second generally annular seal disposed generally axially of said bearing device and axially opposite said first seal, said second seal being joined to said housing, said second seal including a wiper element.

26. (Currently Amended) The cartridge seal assembly as recited in Claim 25, wherein said bearing device being disposed at a generally axially central location of said housing, ~~each of said first seal and~~ said second seal being disposed in respective grooves formed in said housing at opposite sides of the housing central location and bonded to the housing at the central location thereof.

27. (Original) The cartridge seal assembly as recited in Claim 20, wherein the static sealing area of said first seal further includes:

a generally annular seal circumferentially disposed at least in part about said housing.

28. (Original) The cartridge seal assembly as recited in Claim 20, wherein the static sealing area of said first seal further includes:

a first static sealing portion extending generally radially along a generally axially-facing end surface of said housing; and

a second static sealing portion engaging the first static sealing portion and extending at least in part immediately past the axial plane of an outer radial surface of said housing.

Application No.: 10/673,764

Attorney Docket No.: SHA-129

Amendment Dated: April 6, 2005

Reply for Office Action Dated: October 6, 2005

29. (Currently Amended) A cartridge seal assembly, comprising:

a housing having a channel space formed therein to define an inner surface, said housing further including a first generally annular groove and a second generally annular groove defined at respective sides of said housing;

a bearing device joined to said housing at the inner surface thereof by bonding and having at least one bearing surface;

a first generally annular seal disposed at least in part within the first groove of said housing and removably joined thereto; and

a second generally annular seal disposed at least in part within the second groove of said housing and joined thereto.

30. (Withdrawn) The cartridge seal assembly as recited in Claim 29, wherein at least one of said bearing device, said first seal, and said second seal being bonded to said housing.

31. (Withdrawn) The cartridge seal assembly as recited in Claim 29, wherein at least one of said bearing device, said first seal, and said second seal being removably joined to said housing.

32. (Original) The cartridge seal assembly as recited in Claim 29, wherein:

said first seal includes a static sealing area and/or a dynamic sealing area; and

said second seal including a wiper configuration.

33. (Original) The cartridge seal assembly as recited in Claim 32, wherein the static sealing area of said first seal further includes:

Application No.: 10/673,764

Attorney Docket No.: SHA-129

Amendment Dated: April 6, 2005

Reply for Office Action Dated: October 6, 2005

a first static sealing portion extending generally radially along a generally axially-facing end surface of said housing; and

a second static sealing portion engaging the first static sealing portion and extending at least in part immediately past the axial plane of an outer radial surface of said housing.

34. (Original) The cartridge seal assembly as recited in Claim 29, further includes:

a generally annular seal portion circumferentially disposed at least in part about said housing.

35. (Currently Amended) A cartridge seal assembly, comprising:

a housing having a receptacle channel formed therethrough;

a first means bondedly joined to said housing, said first means to define a bearing surface within the receptacle channel; and

a seal system having at least one seal, said seal system being removably joined to said housing.

36. (Original) The cartridge seal assembly as recited in Claim 35, wherein said first means further includes:

a portion of said housing.

37. (Original) The cartridge seal assembly as recited in Claim 35, wherein said first means further includes:

a bearing device joined to said housing at an inner surface defined by said receptacle channel.

Application No.: 10/673,764

Attorney Docket No.: SHA-129

Amendment Dated: April 6, 2005

Reply for Office Action Dated: October 6, 2005

38. (Withdrawn) The cartridge seal assembly as recited in Claim 37, wherein said bearing device and/or at least one seal of said seal system being bonded to said housing.

39. (Original) The cartridge seal assembly as recited in Claim 37, wherein the joining relationship between said bearing device and said housing being defined by a substantially gap-free interface inhibiting extrusion.

40. (Original) The cartridge seal assembly as recited in Claim 35, wherein said seal system further includes:

a first generally annular seal bonded to said housing, said first seal including a static sealing area and/or a dynamic sealing area; and

a second generally annular seal bonded to said housing, said second seal including a wiper configuration.

41. (Withdrawn) The cartridge seal assembly as recited in Claim 40, wherein said first means includes a bearing device bonded to said housing at an inner surface defined by said receptacle channel.

42. (Currently amended) An apparatus, comprising:

a housing having a receptacle channel formed therethrough to define an inner housing surface;

a bearing device bonded to said housing at the inner housing surface; and  
at least one seal removably joined to said housing.

Application No.: 10/673,764

Attorney Docket No.: SHA-129

Amendment Dated: April 6, 2005

Reply for Office Action Dated: October 6, 2005

43. (withdrawn) The apparatus as recited in Claim 42, wherein at least one of said at least one seal being bonded to said housing.

44. (Original) The apparatus as recited in Claim 42, wherein the at least one seal further includes:

a first generally annular seal having a static sealing area and/or a dynamic sealing area;  
and

a second generally annular seal having a wiper element.

45. (Original) The apparatus as recited in Claim 42, wherein the at least one seal further includes:

a seal circumferentially disposed at least in part about said housing.

46. (Currently Amended) A method of producing a cartridge seal assembly, comprising the steps of:

providing a housing having a channel space formed therethrough to define an inner surface;

bonding a bearing structure to the inner surface; and

removably joining at least one seal to said housing.

47. (Withdrawn) The method as recited in Claim 46, wherein the joining step further includes the step of:

bonding the at least one seal to said housing.

48. (Withdrawn) A method of producing a cartridge seal assembly, comprising the steps of:

Application No.: 10/673,764

Attorney Docket No.: SHA-129

Amendment Dated: April 6, 2005

Reply for Office Action Dated: October 6, 2005

providing a housing having a channel space formed therethrough to define an inner surface;

joining a bearing structure to the inner surface to define a joining interface therebetween being substantially gap-free; and

joining at least one seal to said housing.

49. (Withdrawn) The method as recited in Claim 48, wherein the step of joining the bearing structure to the housing inner surface further includes the step of: bonding the bearing structure to said housing.